

JOURNAL  
OF THE  
WASHINGTON ACADEMY OF SCIENCES

VOL. 18

JANUARY 19, 1928

No. 2

BOTANY.—*Twelve new American Asteraceae.*<sup>1</sup> S. F. BLAKE, Bureau of Plant Industry.

This paper contains descriptions of twelve new species of American Asteraceae which have been found in the course of identification of material of that family recently received at the United States National Museum and among specimens lent for study by the curators of the Kew Herbarium, the British Museum of Natural History, and the Museum d'Histoire Naturelle, Paris. A few new names and transfers are also included.

***Erigeron porteri* Blake, nom. nov.**

*Erigeron glandulosum* Porter in Porter & Coulter, Syn. Fl. Colo. 60. 1874.  
Not *E. glandulosum* Walt. Fl. Carol. 205. 1788, nor Poir. Encycl. 8: 487. 1808, nor Hegetschw. Fl. Schweiz 840. 1840.

The name *Erigeron glandulosus* Porter, in common use for a plant of Colorado and Wyoming, is not available for this species owing to the previous use of the same specific name by Walter, Poiret, and Hegetschweiler. Walter's name, omitted from the Index Kewensis and not referred to in Gray's Synoptical Flora, seems from description to refer to *Chrysopsis mariana*. Poiret described under the same name the plant now known as *Chrysopsis graminifolia* (Michx.) Ell., citing Michaux's name (*Inula graminifolia*) and Walter's as synonyms, the latter with doubt. Hegetschweiler's homonym is retained by Schinz and Thellung for a species of *Erigeron* of the Swiss Alps. The last name was omitted from the original volumes of the Index Kewensis, but is included in the fifth supplement, where its date is wrongly given as 1839.

***Rumfordia guatemalensis* (Coulter) Blake.**

*Tetragonotheca guatemalensis* Coulter, Bot. Gaz. 16: 99. 1891.  
*Rumfordia verapazensis* Blake, Contr. U. S. Nat. Herb. 22: 609. 1924.

The type of *Tetragonotheca guatemalensis* Coulter (*J. D. Smith* 1592, Senahú, Dept. Alta Verapaz, Guatemala), recently given by Capt. John

<sup>1</sup> Received November 23, 1927.

Donnell Smith to the U. S. National Herbarium, is the same species as *Rumfordia verapazensis* Blake, described from the Finca Sepacuité, in the same Department. The lower leaves have deltoid, membranous blades, about 18 by 18 cm., acuminate, cordate at base, hastately about 2-toothed on the basal lobes with short, acuminate teeth 1-1.5 cm. long, and with 1 or 2 small deltoid teeth on each side above the base; the petioles are 10-11 cm. long, narrowly cuneate-winged to base.

*Aspilia quinquenervis* Blake, sp. nov.

Shrub; branches densely strigose; leaves lance-ovate or oblong-ovate, large, long-acuminate, rounded at base, obscurely serrulate, 5-plinerved, strigose or antrorse-hirsute on both sides, on naked petioles; heads medium-sized, in a terminal cyme of 3, radiate, yellow; involucre 6-8 mm. high, slightly graduate, the outer phyllaries obovate, strigose and ciliate, the loose ovate acutish herbaceous tips about equaling the indurate base; rays short, little exceeding the involucre; pappus without awns.

"White-wooded shrub, the branches thin, up to 5 m. long," striatulate, about 3.5 mm. thick, strigose with tuberculate-based hairs; internodes 3.5-6 cm. long; leaves opposite; petioles slender, tuberculate-strigose, sulcate above, 7-15 mm. long; blades 10.5-18 cm. long, 3-6 cm. wide, serrulate (teeth short, callous, 4-8 mm. apart), papery, above dull green, evenly and somewhat harshly tuberculate-strigose or antrorse-hirsute, beneath scarcely lighter green, antrorse-hirsute on veins and surface with scarcely tuberculate-based hairs, quintuplinerved, the two pairs of lateral veins arising within 1.5 cm. above base of blade, the principal veins prominent on both sides, not obviously reticulate; heads (rather young) about 1.4 cm. wide, in a terminal 3-headed cyme and solitary in the uppermost axils, on slender strigose peduncles 2-4 cm. long; disk 8-9 mm. high, 7-9 mm. thick; involucre campanulate-subglobose, 6-8 mm. high, 3-4-seriate, the phyllaries rather few, the 2-3 outer series obovate to oval-obovate, 3-5 mm. wide, below indurate, strigose, and ciliate, the equal or longer herbaceous tips loosely spreading, obscurely callous-tipped, strigose and strigillose on both sides, the inner phyllaries scarcely longer, with essentially glabrous or obscurely strigillose, short-ciliate, ampliate, submembranous tips; rays about 8, yellow, neutral, the lamina about 5.5 mm. long; disk corollas puberulous on teeth, otherwise glabrous, 5.2 mm. long (tube 1.5 mm., throat 3 mm., teeth 0.7 mm.); pales obtusely acuminate, about 8 mm. long, keeled, ciliolate on keel and margin, otherwise glabrous; disk achenes (immature) nearly linear, 5.5 mm. long, densely pilose above, glabrous toward base; pappus a crown of lacerate, ciliate, connate squamallae about 0.5 mm. long and 2 trigonous, ciliate teeth about 1 mm. long.

COLOMBIA: In bushes, Rio Palace, highlands of Popayán, alt. 1500-1800 m., February, *Lehmann* (type in Kew Herb.; photog. and fragm., U. S. Nat. Herb.).

Allied to *A. nigropunctata* Blake and *A. retroflexa* Blake, but distinguished from both by characters of leaves and involucre.

*Simsia grayii* Sch. Bip., sp. nov.

Stem densely spreading-hispidulous and sparsely spreading-setose; leaves opposite, triangular-ovate, hastate-lobed, finely hispidulous and sparsely setose, the petioles winged throughout, connate at base into foliaceous

disks; heads radiate, yellow, the disk turning purple; involucre 3-4-seriate, strongly graduate, 7 mm. high; achenes 4 mm. long, 2-awned.

Herb; stem slender, oppositely branched above with divergent or wide-spreading branches; internodes 10.5-13 cm. long; petioles 2-3 cm. long, narrowly or broadly winged to base and there dilated and connate into foliaceous disks 7-12 mm. wide; blades triangular-ovate, 6-8.5 cm. long, 3-5 cm. wide, acuminate, at base subtruncate and then shortly cuneate into the petiole, hastately lobed (lobes short, broadly triangular, obtusish), crenate-serrate except at base and apex with short callous-apiculate teeth, rather thin, above densely and harshly hispidulous and sparsely setose, beneath somewhat paler, densely and finely spreading-hispidulous, setose along the chief veins, triplinerved at base and prominulous-reticulate beneath; leaves of the inflorescence smaller, not hastate, often alternate, mostly lanceolate, their short petioles margined and at base auriculate but not connate; heads about 12 mm. wide, in cymes of 2-5 at tips of stem and branches, on very slender naked pedicels 2 cm. long or less; disk campanulate, 8-10 mm. high, 8 mm. thick; phyllaries lance-triangular (0.5-1.3 mm. wide), acuminate, with short loose subherbaceous tips, densely and finely hispidulous, tuberculate-setulose at tip, the outer very sparsely setose chiefly along midline, the inner about 5-nerved; rays 8, yellow, the lamina elliptic, 4.5 mm. long; disk corollas yellow turning purple, stipitate-glandular on tube, finely hispidulous on throat and teeth, 7 mm. long at maturity (tube 1.3 mm., throat cylindric, 4.7 mm., teeth ovate, 1 mm.); pales acute or acuminate, hispidulous, at apex short-hispid, 7-8 mm. long; achenes oval, blackish, erect-pilose, ciliate, 4 mm. long, 2.5 mm. wide; awns 2, subequal, hispidulous, 2.3 mm. long.

MEXICO: Tepinapa, Oaxaca, Oct. 1842, *Liebmann* 560 (herb. Sch. Bip.; photog. and fragm., U. S. Nat. Herb.). Province of Oaxaca, *Liebmann* 561 (type in herb. Sch. Bip.; photog. and fragm., U. S. Nat. Herb.). Province of Oaxaca, *Buchinger* 497 (herb. Sch. Bip.).

Related to *Simsia setosa* Blake, of Sonora, *S. tenuis* (Fernald) Blake, of Guerrero, and *S. holwayi* Blake, of Guatemala; distinguished by its combination of sparsely setose stem, hastately 3-lobed leaves, these short-pubescent beneath and with petioles margined to base, and small heads. The specimen collected by Buchinger, labeled by Schultz in 1852 as a new species under a different name, was placed in the same cover in the Schultz herbarium with *Liebmann* 560 and 561, which he named *Simsia grayii* in 1854.

***Zexmenia mexiae* Blake, sp. nov.**

Suffrutescent, ternately branched, strigose and strigillose throughout; leaves ovate, short-petioled, acuminate, rounded at base, serrate, 5-plinerved, the blades about 8 cm. long; heads radiate, medium-sized, mostly in terminal cymes of 5-9, on pedicels usually 3-5 cm. long; involucre strongly graduate, about 8 mm. high, appressed, the phyllaries suborbicular-ovate to oblong-oval, the outer shortly callous-pointed, the inner rounded; achenes very narrowly wing-margined; pappus of 2 awns equaling the achene and a crown of basally connate squamellae 1.5 mm. long or less.

Plant 2 m. high; stem subterete, striate, gray-brown, about 4 mm. thick, rather densely strigose and strigillose with slightly tuberculate-based hairs;



internodes 8–12 cm. long; leaves opposite; petioles naked, densely strigose, strigillose, and hispid-ciliate, 3–6 mm. long; blades 6–9 cm. long, 3–4.3 cm. wide, broadly rounded or subcordate at base, serrate (teeth acutely callous-tipped, about 0.5 mm. high, 3–7 mm. apart), pergamentaceous, above more or less shining green, strigillose on surface with scarcely tuberculate-based hairs, strigose along the veins, beneath duller green, strigillose on surface and veinlets, strigose along the veins, somewhat bullate above, loosely prominulous-reticulate beneath; heads 2 cm. wide, in terminal cymes, and solitary or in clusters of 2–3 in the upper axils, the slender densely strigillose pedicels 1.5–7 cm. long; disk campanulate, 1–1.4 cm. high, 7–10 mm. thick; involucre about 5-seriate, 8–9 mm. high, 7–9 mm. thick, the outer phyllaries broadly ovate or suborbicular, abruptly and acutely callous-pointed, densely strigose, strigillose, and short-ciliate, with indurate base or lower margin and greenish apex, about 4.5 mm. long, 3–4 mm. wide, the middle ones similar but longer and broader, the inner oblong-oval, 4.5–5 mm. wide, strigillose, with short-ciliate, erose, broadly rounded, submembranous tips; rays 13, pistillate, golden-yellow, glabrous, the tube 3 mm. long, the lamina elliptic, 9 mm. long, 3 mm. wide, about 11-nerved, tridenticulate; disk flowers about 63, their corollas golden yellow, much exerted at maturity, glabrous outside, 6.5–8 mm. long (tube 2–2.7 mm., throat slender-funnel-form, 4–4.5 mm., teeth ovate, papillose-margined inside, 0.8 mm. long); receptacle flattish; pales narrow, 8 mm. long, carinate, hispidulous-ciliate on keel and toward apex, tridentate, the middle tooth obtuse, about 2 mm. long, flattish, the lateral ones short; ray achenes trigonous, 3-aristate (inner awn longest, about 2.5 mm. long), narrowly 3-marginate-winged, otherwise essentially similar to disk achenes; disk achenes narrowly obovate, strongly compressed, very narrowly wing-margined, 4.5 mm. long, 1.5 mm. wide, blackish, obscurely strigillose at apex, spinulose-ciliate on wings, the wings adnate at base to the 2 awns, these unequal, spinulose, 3.5–4.5 mm. long, connected at base by a crown of basally connate squamellae 0.5–1.5 mm. long.

MEXICO: In woods, Palapar Redondo, Tuxpan, Jalisco, alt. 20 m., 5 Nov. 1926, *Ynes Mexia* 1049 (type no. 1,317, 609, U. S. Nat. Herb.).

Nearest *Zexmenia microcephala* Hemsl., which has much smaller, fewer-flowered heads on pedicels only 1–2 cm. long. Described by the collector as a large, coarse, erect, showy plant, with the vernacular name "tacote amarillo."

#### *Otopappus cordatus* Blake, sp. nov.

Stem and pedicels strigillose; leaves ovate, cordate, slender-petioled, 3-nerved from base, repand-dentate, rough on both sides; heads medium-sized, solitary at apex of stem and in upper axils on widely spreading pedicels about 2.5 cm. long; outer phyllaries spatulate, with spreading herbaceous tips; rays about 32, about 3 mm. long.

Shrub; branch slender, densely cinereous-strigillose with somewhat tuberculate-based hairs; leaves opposite throughout; internodes 5–7 cm. long; petioles naked, subterete, shallowly sulcate above, densely strigillose, 1.5–2.7 cm. long; blades ovate, 8.5–11 cm. long, 4.5–8 cm. wide, acuminate, cordate at base (sinus 1.2 cm. deep or less) or the upper subtruncate, repand-dentate and denticulate with unequal callous teeth essentially throughout (teeth 3–5 mm. apart), or the uppermost merely denticulate, pergamentaceous.

ous, above deep green, densely and harshly antrorse-hispidulous with glandular-tuberculate-based hairs, impressed-veined and subbullate, beneath lighter green, densely antrorse-hispidulous on all veins and veinlets, gland-dotted, 3-nerved from base and densely prominulous-reticulate, the principal veinlets for the most part diverging at a right angle from their respective veins; heads 9, 1.2–1.5 cm. wide, the lower in the axils of foliage leaves, the uppermost subtended by narrowly lanceolate bracts 2.5 cm. long; disk in flower about 9 mm. high, 12 mm. thick; involucre broadly campanulate, 4–5-seriate, graduate, 6 mm. high, the 2 outermost series of phyllaries spatulate, 3–5 mm. long, 1–1.5 mm. wide, with subindurate base and longer, obtuse, spreading, herbaceous tip, 1-ribbed, strigillose, the 2–3 inner series oblong, obtuse to acute, erect, with obscurely greenish, densely strigillose center and narrow, golden-yellow, subscarios, glabrous margin; rays about 32, fertile, golden yellow, sub-2-seriate, spreading, the tube glabrous, 0.5 mm. long, the lamina oval, bidentate, pilosulous on nerves of back, 7-nerved, 3 mm. long, 2 mm. wide; disk corollas numerous, golden yellow, essentially glabrous outside, barbellate within toward apex of teeth, 3.8 mm. long (tube 0.5 mm., throat slender-funnelform, 2.7 mm., teeth ovate, 0.6 mm.); pales very narrow, keeled, 5.5 mm. long, with firm, acute, yellow, hispidulous-ciliolate tips; ray achenes (submature) trigonous, 3 mm. long, 3-winged, the wings hispidulous-ciliolate, adnate throughout to the 3 awns, these 0.8–1.4 mm. long, connected by a crown of connate lacerate squamellae up to 0.4 mm. long; disk achenes (submature) compressed, the body narrowly obovate, glabrous, 3 mm. long, 0.8 mm. wide, 2-winged, the outer wing glabrous, narrow, adnate to the hispidulous-ciliolate awn (this 1.7 mm. long), the inner wing hispidulous-ciliolate, much broadened above and adnate to the awn (this 2 mm. long); squamellae united into a lacerate crown 0.6 mm. long, adnate below to the awns.

MEXICO: Achotla, Guerrero, alt. 900 m., Oct. 1926, *B. P. Reko* 5011 (type no. 1,269,429, U. S. Nat. Herb.).

Nearest *Otopappus salazari* Blake, but with much broader, deeply cordate, strongly reticulate, conspicuously toothed leaves, fewer and larger heads, and much shorter and more numerous rays.

#### *Oyedaea obovata* Blake, sp. nov.

Stem and branches densely appressed-pubescent; leaves elliptic-ovate or ovate, short-petioled, acute, rounded at base, obscurely serrulate, roughish above with subappressed hairs, hirsute beneath, featherveined, about 6 cm. long; heads medium-sized, short-pedicelled, in close clusters of 3–6 at tips of stem and branches; involucre 1–1.2 cm. high, the outer phyllaries with indurate base and abruptly broader, suborbicular-ovate, acute, herbaceous tip.

Shrub; branches alternate or opposite; stem stout (3–5 mm. thick), subterete, striatulate, at length glabrescent, the branches erectish, subangulate, densely and griseously appressed-pubescent or substrigose; internodes 1–3.5 cm. long; petioles stout, naked, pubescent like the stem, 5–9 mm. long; blades 4.5–7 cm. long, 2–3 cm. wide, broadly rounded to cuneate-rounded at base, obscurely serrulate (teeth minute, 2–4 mm. apart) on the slightly revolute margin, subcoriaceous, above deep green, shining, densely and finely tuberculate, more sparsely (along chief veins densely) antrorse-hirsute, beneath evenly and rather densely hirsute on surface and veinlets with

spreading antrorse-curved hairs, along the chief veins antrorse-hirsute with stouter hairs, prominulous-reticulate beneath, the chief lateral veins 7-8 pairs, a pair about 1-1.5 cm. above base of leaf often more conspicuous than the others and frequently forked; heads 2.2-3 cm. wide, in close cymose clusters, usually overtopped by the leaves, the stout pedicels 1-12 mm. long, densely pubescent like the stem or the hairs sometimes spreading; disk about 1 cm. high and thick; involucre campanulate, about 5-seriate, graduate, 1-1.2 cm. high, the 2 outermost series of phyllaries obovate or broadly spatulate-obovate, with indurate base (1.5-3 mm. wide) and abrupt, subequal, suborbicular-ovate, thick-herbaceous, erect or rather loose tip (3-5 mm. wide), subappressed-hirsute, more or less ciliate, and somewhat tuberculate, the middle ones elliptic-oblong or oblong (3-4 mm. wide), with somewhat amplate, subscariosus, broadly rounded tip, less pubescent, the innermost sometimes shorter, subglabrous or sordid-glandular, with subscariosus tip; rays about 10, yellow, neutral, the tube 2 mm. long, the lamina oblong, 2-dentate, about 12 mm. long, 4 mm. wide, about 12-nerved, puberulous on nerves of back; disk corollas numerous, evidently yellow, finely hispidulous on teeth, otherwise glabrous, 5.7 mm. long (tube 2 mm., throat subcylindric, 3 mm., teeth ovate, 0.7 mm.); pales narrow, acute, carinate, obscurely ciliate toward apex, 8 mm. long; disk achenes oblong-obovate, 4 mm. long, 1.5 mm. wide, compressed, very narrowly 2-winged, sparsely appressed-pubescent on sides, short-ciliate; pappus a lacerate-ciliate crown of squamellae 0.8 mm. long and 2 slightly unequal, slender, hispidulous awns 3 mm. long.

VENEZUELA: Agua de Obispo, Province of Trujillo, alt. 2135-2440 m., July 1843, *Linden* 1450 (type in herb. Mus. Paris, dupl. in herb. Sch. Bip.; photog. and fragm., U. S. Nat. Herb.).

In Schultz's herbarium this plant was marked as a new species of *Leighia* (= *Viguiera*), under a name which it has not seemed necessary to cite, with a note indicating that Schultz suspected it might represent a new genus. The specimen in the Paris Herbarium is marked "*Viguiera?*" in Bentham's hand. The plant is definitely an *Oyedaea* near the Colombian *O. reticulata* Blake, but with denser pubescence, somewhat different leaves, and very different, highly characteristic phyllaries.

#### *Verbesina pantoptera* Blake, sp. nov.

Perennial herb, 60 cm. high, simple, 4-7-headed, hispidulous throughout; stem and peduncles very narrowly 4-winged throughout; leaves opposite to middle of stem, the blades ovate, sometimes hastately 3-lobed with obtuse lobes, acute, rounded or abruptly contracted into narrowly cuneate-winged petioles, denticulate, rough-pubescent on both sides, the blade about 5 cm. long; involucre obgraduate, loose, herbaceous, 1-1.2 cm. high, the phyllaries linear or lance-linear; rays about 13, lemon-yellow, the lamina about 1.2 cm. long.

Rootstock short (ca. 2 cm. long); stems apparently few, about 2 mm. thick, spreading-hispidulous, the 4 herbaceous wings entire, scarcely 1 mm. wide; larger leaves about 5 pairs, subremote (internodes 3.5-7 cm. long), the blades 5-6 cm. long, 2.8-3.8 cm. wide, firm-papery, dark dull green above, paler dull green beneath, above evenly tuberculate-hispidulous or short-hispid, beneath rather densely hispidulous on veins and veinlets,



featherveined or obscurely triplinerved, the veins and veinlets prominulous-reticulate beneath, the petioles cuneate-winged to base, not connate, 1.2–2 cm. long, 6–8 mm. wide above, 1.5 mm. wide at base; upper leaves few (about 4), mostly alternate, lanceolate to triangular-ovate, 0.8–2 cm. wide, acuminate, acutely cuneate at base, unlobed; peduncles terminal and in the upper axils, 1–3-headed, 2–9 cm. long, the terminal one shortest; heads 2–3 cm. wide, apparently nodding except at maturity; disk 8–10 mm. high; involucre about 3-seriate, obgraduate, the outermost phyllaries linear or linear-lanceolate, acute or obtuse, callous-tipped, herbaceous essentially throughout, hispidulous or short-hispid on both sides, loose, in age reflexed from above the base, 10–12 mm. long, 1.5 mm. wide, the second series similar but shorter, 8–10 mm. long, the innermost (subtending the rays) still shorter, herbaceous above, subindurate below, acuminate; rays neutral, "lemon yellow," sparsely hirsutulous on tube and back, the tube 1.5–2.5 mm. long, the lamina elliptic, 1.1–1.3 cm. long, about 4 mm. wide, 8–9-nerved, 2–3-denticulate; disk corollas numerous, "lemon yellow," hispidulous chiefly above the middle, 7.5 mm. long (tube 1 mm., throat subcylindric, 5.3 mm. long, teeth 1.2 mm.); pales rather narrow, about 7 mm. long, hispidulous on keel and toward tip, tridentate, the lateral teeth short, the middle one elongate, nearly equaling body of pale, greenish, with slightly recurved tip; achenes (submature) broadly and obliquely obovate, 4 mm. long, 3 mm. wide including wings (these 0.2–0.3 mm. wide), very flat, 1-nerved on each side, glabrous except for the short-ciliate wings, the wings adnate at base to the awns and connected between them by a narrow undulate margin; awns 2, subulate, hispidulous, slightly unequal, 1.2–1.5 mm. long.

MEXICO: Common in open spaces in woods on lower slope of Cordilleras, trail from Tepic to Santiago, State of Nayarit, alt. 1000 m., 15 Sept. 1926, *Ynes Mexia* 632 (type no. 1,317,608, U. S. Nat. Herb.).

A species of the section *Pterophyton*, readily distinguished by its narrowly winged stems and peduncles, in combination with its comparatively long, herbaceous phyllaries. The undulate margin connecting the awns suggests the allied genus *Zexmenia*, but a longitudinal section of the achene indicates that this border is not squamelloid in origin, but is formed by the lateral confluence of the substance of the wings between the awns, which are embedded in it, and around the contracted apex of the achene body. In any case the neutral rays forbid the reference of the species to *Zexmenia*.

***Verbesina heterocarpa* Blake, sp. nov.**

Shrub; stem softly griseous-puberulous with subappressed hairs; leaves of main stem alternate, of branches opposite, lanceolate, about 8 cm. long, acuminate at each end, short-petioled, serrulate, roughish above, softly griseous-pilose-subtomentose and densely dotted with yellow glands beneath; heads rather small, several in small terminal panicles, radiate, yellow; involucre 4–5-seriate, the inner phyllaries with acuminate subscarios tips; pales with yellowish erect acuminate scarious tips; ray achenes glabrous, their pappus of a single squamella; disk achenes pubescent, 2-awned.

Shrub 2.5 m. high, the branches alternate or opposite, about 3 dm. long; main stem subterete, 4 mm. thick, finely appressed-puberulous; branches fuscous, densely subappressed-puberulous and with some not longer more or

less spreading hairs and finely gland-dotted, their internodes usually 2-4.5 cm. long; petioles naked, unappendaged, pubescent like the stem, 4-5 mm. long; blades 7-8 cm. long, 1.3-1.8 cm. wide, serrulate (teeth small, callous, mostly deflexed, 2-3 mm. apart), pergamentaceous, above dull green or purplish-tinged, densely antrorse-hirsutulous with slightly tuberculate-based hairs and gland-dotted, beneath densely pilose-subtomentose with mostly spreading hairs and gland-dotted, featherveined, the lateral veins about 15 pairs, prominulous beneath, the veinlets scarcely prominulous; heads about 1 cm. wide, in flattish or convex panicles (about 3-6 cm. wide) of 15-24 at apex of branches, the bracts lance-linear, mostly 3.5 cm. long or less, the pedicels slender, 5-15 mm. long, pubescent like the stem; involucre 4-5-seriate, strongly graduate, 5-6 mm. high, the outer 2 series of phyllaries ovate, 0.5-1.2 mm. wide, appressed, pilosulous and gland-dotted, subherbaceous above, with short, acutish, purplish, callous tips, the others ovate or lance-ovate, 1.3-2 mm. wide, with subindurate central portion and subscarious, yellowish, sharply acuminate, erect tips, usually fuscous centrally, sparsely pilosulous and dotted with sessile yellow glands; rays 6, golden yellow, pistillate, pilose and stipitate-glandular on tube and base of back, the tube 1.5 mm. long, the lamina oval, emarginate, 6 mm. long, 4-4.5 mm. wide; disk flowers 22, their corollas golden yellow, pilose and stipitate-glandular on tube, sparsely pilose on nerves of throat below, papillose on inner surface of teeth, 6 mm. long (tube 1.5 mm., throat subcylindric, 3.5 mm., teeth ovate, 1 mm.); receptacle strongly convex; pales similar to the inner phyllaries in shape and texture, about 7 mm. long, stipitate-glandular on back and above on margin and very sparsely pilose on back, with scarious, yellowish, sharply acuminate, erect or somewhat incurved tips; ray achenes (very immature) obcompressed or trigonous, glabrous or with a few hairs at apex, narrowly 2-winged, their pappus of a single squamella 0.3 mm. long or less; disk achenes (very immature) compressed, narrowly obovate, 3 mm. long, very narrowly 2-winged, pilosulous above, densely short-ciliate on wings; pappus awns 2, slender, unequal, hispidulous, 2.5-3.2 mm. long.

MEXICO: In opening in oak forest on steep slope, Real Alto, Sierra Madre Occidental, Jalisco, alt. 2500 m., 29 Jan. 1927, *Ynes Mexia* 1587 (type no. 1,317,611, U. S. Nat. Herb.).

A member of the section *Saubinetia*, allied to *V. molinaria* Robins. & Greenm. and *V. oncophora* Robins. & Seaton. In the former the larger, opposite leaves are canescently subsericeous-tomentose beneath, and the involucre and pales are very different; in the latter the leaves are larger and normally alternate, the petioles are provided at base with deciduous corky auricles, the involucre is shorter and simpler, and the much shorter, firmer pales bear abrupt short mucros. The almost complete absence of pappus in the ray flowers of *V. heterocarpa* is a striking feature not found in either of the two related species.

#### *Verbesina glaucophylla* Blake, sp. nov.

Shrubby, leafy, glabrous throughout except for the obscurely puberulous pedicels; leaves chiefly alternate, lanceolate, 9-20 cm. long, acuminate at each end, short-petioled, denticulate, green above, glaucous beneath; heads discoid, whitish, about 36-flowered, slender-pedicel, numerous in a terminal concave cymose panicle; involucre 2-2.5 mm. high; pales with short recurving mucros.



Shrub 1.5–2.5 m. high; stems or branches subterete, simple or little branched, striate, glabrous, glaucescent, 3 mm. thick, pithy; internodes 5–15 mm. long; leaves alternate, or on short branches opposite below, the blades lanceolate, 1.8–3.5 cm. wide, broadest near middle, subremotely denticulate or serrulate-denticulate (teeth blunt, callous, ca. 0.4 mm. high, 3–11 mm. apart), papery to subpergamantaceous, glabrous and smooth on both sides featherveined (lateral veins about 10 pairs), finely translucent-reticulate, the strong costa whitish or purplish, the chief lateral veins prominent; naked portion of petiole grooved above, 3–7 mm. long; heads turbinate-hemispheric, about 8 mm. high, 10 mm. wide, on terminal and axillary peduncles 7.5 cm. long or less, forming a panicle about 11 cm. wide, the bracts mostly narrowly linear, 2–20 mm. long, the pedicels mostly 8–25 mm. long, slightly puberulous especially at apex; involucre 2-seriate, subequal, the phyllaries ovate or oblong-ovate, obtuse, glabrous, subherbaceous, sometimes subtended by a few slightly longer and more herbaceous loose-tipped bracts; corollas whitish, 3.5–4 mm. long (tube densely pilose, 1–1.2 mm., throat glabrous, thick-cylindric, 1.8–2 mm., teeth ovate, short-ciliate on inner margin, 0.7–1 mm. long); receptacle convex; pales cymbiform, yellowish green, 3.5–4 mm. long, strongly carinate, sparsely hispidulous on keel, denticulate on the subscarious margin above, tipped with a short erect or recurving mucro; achenes obovate, 2.6 mm. long, 2.8 mm. wide (including wings), the body blackish, sparsely pilose near apex, about 1.2 mm. wide, the short-ciliate whitish wings about 0.7 mm. wide, prolonged above the achene and adnate to base of awns, the awns 2, subequal, hispidulous, 2 mm. long.

MEXICO: In pine forest on steep dry clay hills, Loma de Garote, trail to San Sebastian, Sierra Madre Occidental, Jalisco, alt. 1500 m., 8 Feb. 1927, *Ynes Mexia* 1649a (type no. 1,317,612, U. S. Nat. Herb.). San Sebastian, east of Arroyo Santa Gertrudis, Jalisco, 17 Jan. 1927, *Mexia* 1507.

A species of the section *Lipactinia*, distinguished by its glabrous character, its glaucescence, and its about 36-flowered heads. The two other Mexican species of this section have 7–9-flowered heads.

***Verbesina rivetii* Blake, sp. nov.**

Stem thinly cinereous-tomentose; leaves alternate, short-petioled, oblong-lanceolate, acuminate, acutely cuneate at base, sharply serrulate, cinereous-tomentose beneath; heads small, 15–17-flowered, radiate, yellow, very numerous in a large flattish terminal panicle; outermost phyllaries oblong, pilosulous; pales slightly ciliate.

Shrub; stem (or branch) simple below the inflorescence, 5 mm. thick, subterete, multistriatulate; internodes 1–2 cm. long; petioles stout, naked, densely cinereous- or canescent-tomentose, 4–7 mm. long; blades 6–10 cm. long, 1.5–2.5 cm. wide, serrate or serrulate above the entire cuneate base (teeth about 7 pairs, callous-tipped, 0.5–1 mm. high, usually 5–10 mm. apart), above deep green, densely and rather harshly pilosulous with antrorse-curved hairs with persistent glandular-tuberculate bases, beneath densely and softly cinereous-tomentose, pergamentaceous, featherveined, the chief lateral veins 5–7 pairs, covered by the tomentum; heads 1–1.2 cm. wide, numerous in dense cymose panicles at tip of stem and branches, together forming a panicle 20 cm. wide, the ultimate bracts minute, the pedicels mostly 6–12 mm. long, spreading-pilosulous; disk subcylindric, 1 cm. high, 4–5 mm. thick; involucre about 3-seriate, 5–7 mm. high, the phyllaries few,

very unequal, the outermost oblong or ovate-oblong, about 2.5 mm. long, 1 mm. wide, subherbaceous, obtusish, callous-tipped, densely pilosulous, the innermost (subtending the rays), 5-7 mm. long, similar to the pales in shape and texture, ciliolate, on back glabrous or somewhat puberulous; rays 4-5, fertile, pilosulous on tube and base of lamina, the tube 2.2 mm. long, the lamina oval or suborbicular, 2-3-denticulate, about 8-nerved, 4-4.8 mm. long, 2.8-3.5 mm. wide; disk flowers 10-13, their corollas densely short-pilose on tube and base of throat, strongly papillose-bearded on margin of teeth within, 5.5-6 mm. long (tube 1.8 mm., throat funnelform, 3-3.3 mm., teeth ovate, 0.8-1 mm.); pales oblong, acute or acutish, blackish green, yellow-margined and -tipped, short-ciliate, essentially glabrous dorsally, about 8 mm. long; ray achenes compressed or trigonous, narrowly winged, their pappus of 2 subequal or very unequal more or less paleaceous awns 2.5 mm. long or less, sometimes reduced to short teeth; disk achenes cuneate-obovate, compressed, blackish, very narrowly 2-winged (wings ciliolate, about 0.1 mm. wide, adnate to base of awns), glabrous or sparsely hispidulous on the sides, 5 mm. long, 1.5 mm. wide; pappus awns 2, subequal, hispidulous, about 3 mm. long.

ECUADOR: Terme Nord, Nov. 1902, *Rivet* 290 (type, Mus. Paris, photog. and fragm., U. S. Nat. Herb.).

A member of the section *Lipactinia*, of the *Verbesina arborea* group, distinguished by its radiate heads, comparatively small sharp-toothed leaves, and merely ciliate pales. It is near the Peruvian *V. grandifolia* Blake, which has densely pubescent pales and very much larger leaves, those subtending the lower branches of the inflorescence in that species being about 2 dm. long, in *V. rivetii* 6 cm. or less.

*Calea longipes* Blake, nom. nov.

*Tridax trianae* Hieron. Bot. Jahrb. Engl. 21: 350. 1896. Not *Calea trianae* Hieron. 1894.

This species was evidently referred to *Tridax* by Hieronymus because of its ciliate pappus awns. It has not the characteristic bilabiate ray corolla of that genus, and its pappus is much nearer that of *Calea*. The linear-lanceolate, attenuate awns have the scarious margin lacerate-ciliate, only slightly more so than in such a *Calea* as *C. caracasana*, and are by no means plumose as is the pappus of *Tridax*. The pappus of the ray flowers is much reduced and only 1 mm. long, while that of the disk reaches 3.5 mm. The species is not closely related to any other species of western South America, but comes near the Mexican *C. palmeri* Gray. I have examined two sheets of *Triana* 1422, the type number of *T. trianae*, from Anaporina (?), Bogotá, alt. 2600 meters (Brit. Mus., Kew), and another from herb. Triana (Brit. Mus.) labeled *Linden* 61. A recent specimen in the U. S. National Herbarium is *Ariste-Joseph* A773, doubtfully from the Department of Cundinamarca. *Stuebel* 176b, also cited by Hieronymus for his new species, has not been available for examination.

*Gynoxys jamesonii* Blake, sp. nov.

Shrub; branches sordidly stellate-tomentose, glabrescent; leaves petioled, elongate-lanceolate, acuminate, repand-denticulate, glabrous above, beneath densely stellate-tomentose with short grayish hairs and loosely brownish-tomentose with longer, somewhat deciduous, stellate hairs; heads small,

white, radiate, crowded in ternately divided panicles, 10–11-flowered; involucre 4.5 mm. high, sordidly stellate-tomentose, somewhat glabrescent; rays 5, short.

Branches somewhat compressed, striatulate; leaves opposite; uppermost internodes 4.5 cm. long; petioles naked, densely sordid-tomentose with stellate hairs, sulcate above and beneath, 1.5–2 cm. long; blades 11–15.5 cm. long, 2–3 cm. wide, rounded to cuneate at base, repand-denticulate (teeth small, callous, 1–2 cm. apart), above dark green, glabrous except for base of costa, closely prominulous-reticulate, beneath densely and doubly stellate-tomentose (the lower tomentum of very short and dense grayish hairs, the upper of much longer, more or less deciduous brownish hairs), pinnate-veined (the lateral veins about 20 pairs, prominulous-reticulate beneath); panicles terminal and pedunculate from the upper axils, convex, 5–12 cm. wide, densely stellate-tomentose with short brownish hairs, the lowest pair of bracts linear, about 2 cm. long, the others minute, subulate, 3 mm. long or less; pedicels 5 mm. long to almost none; heads numerous, somewhat fasciculate, obovoid, 6 mm. wide, the disk 7 mm. high, 3 mm. thick; bractlets at base of involucre 2–3, subulate, appressed, 1.5–2 mm. long, stellate-tomentose, persistent; phyllaries 8, equal, 1.5–1.8 mm. wide, somewhat imbricate, oblong, obtuse, the outermost densely stellate-pubescent with short brown hairs except toward base, the middle ones stellate-pubescent along midline above, the innermost glabrous except at apex; receptacle alveolate, glabrous; rays 5, fertile, glabrous, the tube 3.5 mm. long, the lamina erectish, linear-elliptic, entire, 3 mm. long, 0.6 mm. wide, about 4-nerved; disk corollas 5–6, glabrous, 5.2 mm. long (tube 2.6 mm., throat scarcely wider, 1 mm., teeth rather narrow, 1.6 mm. long); achenes (immature) glabrous, ribbed, 1.5 mm. long; pappus of numerous yellowish-white serrulate bristles 4.5 mm. long or less; style-tips subtruncate-rounded, merely papillose-hispidulous, without evident appendage.

ECUADOR: West side of Mount Pichincha, alt. 3050 m., *Jameson* 227 (type in Kew Herb.; photog. and fragm., U. S. Nat. Herb.).

Described by the collector as a shrub with white, very fragrant flowers. Related to *G. albiflora* Wedd., *G. longifolia* Wedd., and *G. seleriana* Muschl., but distinguished by characters of leaves, heads, and involucre. The double tomentum of the lower leaf surface is like that described for *G. henrici* Mattf., but the plants are otherwise very different.

### ***Gynoxys leiotheca* Blake, sp. nov.**

Branches densely velvety-tomentose; leaves elliptic or oblong-elliptic, obtuse, rounded at base, subentire, coriaceous, soon glabrous and prominulous-reticulate above, densely ochroleucous-velvety-tomentose and prominulous-reticulate beneath; heads discoid, yellow, 7–8-flowered, subsessile or short-pedicelled, cymose-panicled; involucre 6–7 mm. high, glabrous or essentially so.

Shrub; branches subangulate, stoutish, densely velvety-tomentose with ochroleucous or in age fuscous hairs; leaves opposite; petioles similarly tomentose, 1–1.8 cm. long; blades 6–9.5 cm. long, 1.8–2.8 cm. wide, short-apiculate, at base rounded or obscurely cordate, obscurely repand-denticulate with small remote inflexed callous teeth, above at first velvety-tomentose, quickly glabrate and light green, coriaceous, the chief lateral veins 11–13 pairs, diverging at a very obtuse angle; panicles terminal, rounded, many-headed, about 12 cm. wide, pubescent like the stem; heads 8–10 mm. high,



subcylindric, crowded at tips of branches of panicle, the pedicels 5 mm. long or less, usually very short, the lowest branches subtended by somewhat reduced leaves; involucre of about 5 bractlets about 2 mm. long, triangular, acuminate, stiff, persistent, ciliate and somewhat tomentose; phyllaries 5-6, broadly oblong, obtuse, 6-7 mm. long, 1.8-2.2 mm. wide, substramineous, the outer about 5-nerved, the inner about 2-ribbed and with broad subscarios margin, all pilosulous-tufted at apex, on back glabrous to very sparsely pilose, especially toward apex; corollas glabrous, 8.5 mm. long (tube 3.5 mm., throat 2 mm., teeth 3 mm.); achenes glabrous, about 10-ribbed, 3.5 mm. long; pappus yellowish white, 7 mm. long.

ECUADOR: Borna, Sept. 1904, *Rivet* 671 (type, Mus. Paris; photog. and fragm., U. S. Nat. Herb.).

Distinguished by its 7-8-flowered discoid heads and practically glabrous involucre of 5 or 6 broad and blunt phyllaries. Apparently most closely allied, from description, to the radiate *G. szyszyłowiczii* Hieron., of Peru.

***Chuiraga brasiliensis* (Spreng.) Blake.**

*Ioannea brasiliensis* Spreng. Neue Entd. 2: 132. 1821.

*Flotovia glabra* Spreng. Syst. 3: 506. 1826.

*Chuiraga glabra* (Spreng.) Baker in Mart. Fl. Bras. 6<sup>3</sup>: 363. 1884 (synonymy).

Sprengel's name *Ioannea brasiliensis* of 1821, the oldest name applied to this species, was cited by him in 1826 as a synonym of *Flotovia glabra*. The change in the specific name was evidently made because of the addition in 1826 of a second Brazilian species, which he called *F. tomentosa*. The type in the Schultz Bipontinus herbarium at Paris was examined by the writer in 1925.

The generic name is usually written *Chuiraga*, but its original spelling, which should be followed, was *Chuiraga*, both in Jussieu's *Genera* (p. 178. 1789), where the genus was described without mention of any specific name, and in Gmelin's *Systema*,<sup>2</sup> where a specific name (*C. jussieu* Gmel.) was first assigned, based on Jussieu's description.

***Perezia longifolia* Blake, sp. nov.**

Stem glabrous, simple, leafy; leaves very long, lance-elliptic to nearly linear-elliptic, acuminate, cordate-clasping, spinulose-denticulate, firm, loosely reticulate, hispidulous on the veins; heads large, about 46-flowered, mostly solitary in the axils, on short or obsolete peduncles; involucre turbinate, 2.8-3 cm. high, many-seriate, the phyllaries lanceolate, acuminate, glabrous.

Herb, probably tall; stem slender (3 mm. thick), terete, hollow, purplish, glaucescent; internodes 3-5.5 cm. long; leaves alternate, 20-30 cm. long, 4-7.5 cm. wide, closely spinulose-denticulate throughout except at apex with unequal teeth, subcoriaceous, above deep green, slightly shining, roughish with minute hairs along veins and veinlets and on margin, beneath light green, roughish-hispidulous on the venation, featherveined and loosely prominulous-reticulate on both sides, the chief lateral veins about 12-15 pairs, ascending at an acute angle; heads 1-2 in the axils of the middle and upper leaves, 3 cm. high, about 2 cm. thick, on glabrous minutely bracted peduncles 1 cm. long or usually less; involucre about 7-seriate, strongly graduate, the phyllaries erect, acuminate and subcuspidate, substramineous,

<sup>2</sup> Syst. 2: 1205. 1791.

dull-purplish-tipped, 1-ribbed and several-nerved; corollas (white or purple?) bilabiate, 2.3 cm. long, one lip shortly 3-toothed, the other 2-partible to base; achenes (immature) subrostrate, densely glandular and hispidulous, 6.5 mm. long.

MEXICO: Calabaza, Jalisco, 1925, *B. P. Reko* 4872 (type no. 1,269,424, U. S. Nat. Herb.).

This striking species is related to *Perezia formosa* (D. Don) A. Gray and *P. turbinata* Lex. The former has narrow, much smaller leaves, and a different type of inflorescence. The latter, a still dubious plant, Gray's interpretation of which<sup>2</sup> is here followed, is loosely branched above, with slender pedicels, 20-30-flowered heads, and about 3-seriate involucre.

ZOOLOGY.—*Nemic spermatogenesis: with a suggested discussion of simple organisms,—Litobionts.*<sup>1</sup> N. A. COBB, U. S. Department of Agriculture.

*Definitions.* *Spermatidium*: one of a plurality of cells derived from a spermatid by subdivision; a secondary, tertiary, or quaternary, etc., spermatid. *Spermule*: an individual spermatidium which, after growth and transformation, is capable of activating or fertilizing an egg,—being *not* a metamorphosed spermatid, but a descendant of a spermatid, one or more cell-generations removed.

*Spermatogenesis.* At the blind end of the single testis of the nema, *Spirina parasitifera* (Bastian '65) Filipjev (Figs. 1 and 2),—a free living marine species, common an inch or two deep in sand and among small stones between the tide marks of protected coasts on both sides of the North Atlantic through a wide range of latitude,—the primordial gonoc elements give rise by 14-chromosome mitotic division to numerous twin cells (Figs. 2, 14), which arrange themselves tandem in the testis (Fig. 3) where each

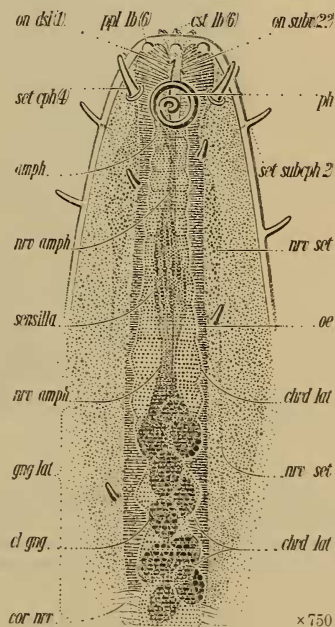


Fig. 1.—Lateral view of the head of *Spirina parasitifera*. The amphidial nerve, *nrv amph*, expands into a sensilla, then again into a 10-12 celled ganglion (seen through the lateral chord, *chrd. lat.*) joining the nerve-ring, *cor nrv*.

<sup>2</sup> Proc. Amer. Acad. 19: 58. 1883.

<sup>1</sup> The investigations were made in part at the laboratories of the U. S. Bureau of Fisheries at Woods Hole, Mass. Received December 3, 1927.